BIOLOGICAL BASIS OF HUNGER

Hunger is a complicated motivation; people don't eat only because they need food. Many factors, both biological and environmental, influence hunger. These factors interact with one another in many ways.

There are a number of physiological mechanisms that serve as the basis for hunger. When our stomachs are empty, they contract, causing both hunger pangs and the secretion of chemical messages that travel to the brain to serve as a signal to initiate feeding behavior. When our blood glucose levels drop, the pancreas and liver generate a number of chemical signals that induce hunger (Konturek et al., 2003; Novin, Robinson, Culbreth, & Tordoff, 1985) and thus initiate feeding behavior.

Biological Factors

Researchers believe certain genetic differences among individuals play a role in hunger. The brain, the digestive system, and hormones are all involved in influencing hunger at the biological level.

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a. Genetic Differences Among Individuals

Researchers theorize that people have a genetically influenced set point for body weight. If a person's weight rises too far above his set point, his appetite decreases, or he uses up more energy. His weight then returns to its set point. If, on the other hand, his weight falls too far below his set point, his appetite increases, or he uses less energy. Once again, he returns to his set point.

The set point is maintained not only by food intake and energy expenditure but also by the body's basal metabolic rate, another genetically influenced variable. Basal metabolic rate is the rate at which a person at complete rest uses energy.

Some researchers disagree about set points and believe that people can reset their normal weight if they add or lose pounds slowly. They also point out that people usually gain weight when they have easy access to rich foods.

b. The Brain

Researchers believe three areas in the hypothalamus play a key role in regulating hunger:

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1. The lateral hypothalamus is involved in recognizing hunger. In rats, damage to the lateral hypothalamus results in loss of interest in eating.
2. The ventromedial nucleus of the hypothalamus is involved in recognizing satiety or fullness. In rats, damage to the ventromedial nucleus results in excessive eating and weight gain.
3. The paraventricular nucleus of the hypothalamus is also involved in hunger regulation. When the paraventricular nucleus of a rat is damaged, the rat will eat a very large quantity of food at each meal.

c. The Digestive System

The digestive system influences hunger in several ways. For instance, after a meal, the stomach and intestines send nerve impulses to the brain to help people recognize that they are full.

The body converts food to glucose, a simple sugar that acts as an energy source for cells. The level of glucose in the blood affects hunger. Low blood glucose increases hunger; high blood glucose decreases hunger.

d.Hormones

The hormone insulin also plays an important role in regulating hunger. Insulin allows cells to access glucose in the blood. When the pancreas secretes insulin, hunger increases. Diabetes is a condition caused by a deficiency of insulin. People who have diabetes take injections of insulin. Without these injections, their cells would be unable to use the glucose in their blood.

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Another hormone involved in hunger regulation is leptin. Fat cells in the body secrete leptin and release it into the blood. When the leptin level in the blood is high, hunger decreases.

Environmental Factors

Many environmental factors influence hunger, including the availability of rich foods, taste preferences, habits, memory, stress, and cultural attitudes.

Biological Basis of Sex

Unlike hunger, sexual drive does not motivate people to fulfill a basic biological need. A lack of food leads to death; a lack of sex, on the other hand, does not. Both biological and psychological factors strongly influence sexual drive.

The Sexual Response Cycle

Masters and Johnson divided the human sexual response cycle into four phases:

1. Excitement phase: Physiological arousal increases quickly. Muscle tension, heart rate, blood pressure, and breathing rate increase. In men, the penis gets erect and the testes swell. In women, the clitoris hardens and swells, the vaginal lips open, and the vagina lubricates.
2. Plateau phase: Physiological arousal continues. In women, the clitoris retracts under the clitoral hood. Men may secrete a small amount of fluid from the penis.
3. Orgasm phase: Physiological arousal peaks. Men ejaculate seminal fluid. Both men and women experience muscular contractions in the pelvic area, along with a sensation of pleasure.
4. Resolution phase: Physiological responses return to normal levels. Men then go through a refractory period that can vary in length, during which they are not responsive to stimulation. The refractory period tends to get longer as men age.

Psychological Factors in Sexual Motivation

Hormones alone cannot cause sexual arousal. Psychological factors are also highly influential.

• Erotic stimuli: Both men and women can become sexually aroused by external and internal erotic stimuli. External erotic stimuli include sexually exciting material that is read, heard, or seen. Internal erotic stimuli include thoughts, fantasies, and memories of past sexual experiences. What is considered erotic varies according to the individual, historical period, and cultural context.

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• Desires: People have an infinite number of desires that influence the motivation for sex, including to procreate, to express love, to have physical enjoyment, to cope with difficult situations and emotions, to validate one's desirability, and to do what peers do.

• Cultural context: Having a strong influence on sexual behavior, cultures inform people about sexual scripts, or implicit rules that allow a person to judge the appropriate sexual behavior for a given situation. For example, people follow sexual scripts when deciding whether they should initiate sexual activity or wait to receive a partner's advances.

A culture's social and economic structure determines the gender roles that men and women adopt. These gender roles in turn determine people's attitude toward sexual activity. In some cultures, for instance, women need marriage to get access to status and wealth. In such cultures, a woman is less likely to be interested in sex for its own sake, since casual sex can damage her reputation and reduce her chances of marriage.

Eating Disorders

While nearly two out of three US adults struggle with issues related to being overweight, a smaller, but significant, portion of the population has eating disorders that typically result in being normal weight or underweight. Often, these individuals are fearful of gaining weight. Individuals who suffer from bulimia nervosa and anorexia nervosa face many adverse health consequences (Mayo Clinic, 2012a, 2012b)

Bulimia Nervosa

People suffering from bulimia nervosa engage in binge eating behavior that is followed by an attempt to compensate for the large amount of food consumed. Purging the food by inducing vomiting or through the use of laxatives are two common compensatory behaviors. Some affected individuals engage in excessive amounts of exercise to compensate for their binges. Bulimia is associated with many adverse health consequences that can include kidney failure, heart failure, and tooth decay. In addition, these individuals often suffer from anxiety and depression, and they are at an increased risk for substance abuse (Mayo Clinic, 2012b). The lifetime prevalence rate for bulimia nervosa is estimated at around 1% for women and less than 0.5% for men (Smink, van Hoeken, & Hoek, 2012).

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As of the 2013 release of the Diagnostic and Statistical Manual, fifth edition, Binge eating disorder is a disorder recognized by the American Psychiatric Association (APA). Unlike with bulimia, eating binges are not followed by inappropriate behavior, such as purging, but they are followed by distress, including feelings of guilt and embarrassment. The resulting psychological distress distinguishes binge eating disorder from overeating (American Psychiatric Association [APA], 2013).

Anorexia Nervosa

Anorexia nervosa is an eating disorder characterized by the maintenance of a body weight well below average through starvation and/or excessive exercise. Individuals suffering from anorexianervosa often have a distorted body image, referenced in literature as a type of body dysmorphia, meaning that they view themselves as overweight even though they are not. Like bulimia nervosa, anorexia nervosa is associated with a number of significant negative health outcomes: bone loss, heart failure, kidney failure, amenorrhea (cessation of the menstrual period), reduced function of the gonads, and in extreme cases, death. Furthermore, there is an increased risk for a number of psychological problems, which

include anxiety disorders, mood disorders, and substance abuse (Mayo Clinic, 2012a). Estimates of the prevalence of anorexia nervosa vary from study to study but generally range from just under one percent to just over four percent in women. Generally, prevalence rates are considerably lower for men (Smink et al., 2012).

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